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Bulletin of the AAS • Vol. 56, Issue 7 (AAS244 Abstracts)

Twin Jets and Twin Disks: JWST MIRI and ALMA Discoveries in the Young WL20 Multiple System

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Published on: Jun 19, 2024

URL: https://baas.aas.org/pub/2024n7i413p01

We report the first discovery of jets emanating from pre-main-sequence objects exclusively at mid-infrared wavelengths, enabled by the superb sensitivity of JWST's MIRI MRS instrument. These jets are observed only in ionized lines of [NiII], [FeII], [ArII], and [NeII]. The H2 emission, imaged in eight distinct transitions, has a completely different morphology, outlining the inner walls of a wide-angled, bipolar cavity symmetrically distributed about the jet axes. Synergistic high-resolution ALMA observations resolve a pair of side-by-side edge-on accretion disks lying at the origin of the twin mid-infrared jets. Assuming coevality of the components of the young multiple system under investigation, the system age is at least 2 - 2.5 MYr (Ressler & Barsony 2001), despite the discrepantly younger age inferred from the spectral energy distribution of the combined edge-on disk sources. The later system evolutionary stage is corroborated by ALMA observations of CO(2-1), 13CO(2-1), and C18O(2-1), which show no traces of *molecular* outflow activity. A recent near-infrared JWST study demonstrated that bipolar jets powered by a source at the earliest recognizable protostellar evolutionary stage are almost entirely molecular (Ray et al. 2023). Analogously, we suggest that the oldest jets driven by pre-main-sequence sources may be entirely ionized, as is the case for the twin jets reported on here, which lie in the nearby (d=125 pc) Ophiuchus star-forming region.